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Central College Takes "Leed" on Green Building Design

Central College's Vermeer Science Center (VSC) was recently awarded a Leadership in Energy and Environmental Design (LEED) Silver Medal from the U.S. Green Building Council (USGBC), making the building the first LEED-Certified facility in Iowa.

The achievement was the result of Central's leadership in a number of innovative sustainable design practices incorporated in the VSC's renovation and expansion, completed in 2003.

According to the USGBC, 91 facilities have received LEED certification at various levels; Central College is one of 22 silver medal winners.

"The (LEED) standards are stringent, and the process is rigorous," said Mike Lubberden, Central College director of construction and energy management, who spearheaded the project and was named Iowa's first LEED-accredited professional. "However, this keeps the rating system meaningful."

The LEED Green Building Rating System is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings. It emphasizes state-of-the-art strategies for sustainable site development, water savings, energy efficiency, materials selection, indoor environmental quality and low atmospheric emissions, and offers project certification, professional accreditation, training, and resources.

"Building LEED just makes good business sense and is something that all building managers should explore," said Christine Ervin, president and CEO of the USGBC. "The achievement of the VSC's LEED Silver rating is significant given the high standard that the VSC applied to the design and construction of their facility, ranging from significant reduction in water usage to the recycled content of the materials and resources used in the project. The college will realize added benefits in the form of energy savings from reduced energy use."

Vermeer Science Center Accomplishments

As a laboratory facility, the VSC faced unique challenges. Extensive use of fume hoods and high ventilation requirements typically make laboratory buildings high energy users.

By installing variable flow fume hoods and a heat recovery system that integrate with unique building automation features, the labs are decommissioned during off-use periods. Central's engineers estimate an average annual energy savings of \$8,000 for this project alone.

Another unique feature demonstrates solar energy in action. A fountain at the building's main entrance is powered by one of two rooftop 4-kW photovoltaic arrays, donated by Alliant Energy. (The other array provides energy to Central's Carlson-Kuyper Field Station.) The flow of the fountain varies with available sunlight and slopes down to a granite bench for the public.

Many other features make the

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Iowa Utilities Give Customers Power to Choose

Iowans now have the opportunity to make green choices on their utility bills. As of January 1, 2004, all electric utilities in Iowa are required to offer green power options to their customers. These programs allow customers to make contributions to support the development of renewable energy sources in Iowa. According to Patti Cale-Finnegan, renewable energy program planner at the DNR, the national average customer participation rate ranges from 1 to 3 percent of the customer base. Most Iowa programs have only been in place for several months, and already electric utilities are seeing results. Here are some examples of Iowa green power programs:

Muscatine Power and Water

Muscatine Power and Water is the only utility in the state to offer solar power as a renewable energy option. In early February, two large solar arrays were installed in front of the utility's administration/operations building. The arrays are capable of annually producing more than 4,000 kWh of power. In the short time the arrays have been in place, 92 residential customers have signed up for "Solar Muscatine," the utility's alternative energy program. Customers can donate \$3, \$5, or \$7 per month to purchase green power from the solar arrays. The advantages of "Solar Muscatine" also extend to those who do not contribute to the program.

"Because we provide power and water to community buildings for free, everyone in Muscatine benefits from our program," said John Root, energy services advisor for Muscatine Power and Water. As support continues to grow, Muscatine Power and Water plans to install more solar arrays, and will target nonresidential customers of its program, as only 10 percent of the electric utility's total revenue comes from its residential customers.



New star-shaped photovoltaic arrays at Muscatine Power and

Alliant Energy

Since 2001, Alliant Energy-Interstate Power & Light Company (IPL), one of the largest utility companies in Iowa, has offered its Second Nature program to residential customers interested in purchasing green power. More than 5,100 customers, or approximately 1.3 percent of IPL's residential base, participate in the program. The U.S. Department of Energy's National

Renewable Energy Laboratory (NREL) ranks Second Nature number seven in the nation with 9,519 total customer participants in its three-state service area. Second Nature is also ranked ninth in the country in renewable energy sales, with 27,958,473 kWh sold in 2003.

The Second Nature program relies on both wind and biomass energy from Wisconsin, Minnesota and Iowa.

Customers support renewable energy by purchasing (at two cents per renewable kWh) in an amount equivalent to 25 percent, 50 percent, or 100 percent of their total electric use each month.

"Our program allows customers to promote the growth of renewable energy and improve the environment by reducing emissions," said Kelly Smith, product manager at Alliant Energy. "In 2003 alone, the contributions our customers made were the equivalent of keeping 5,000 passenger cars off the road or planting over 6,800 acres of

trees. Proof that individuals really can make a difference." IPL began offering Second Nature to non-residential customers in January 2004, where businesses are able to make a monthly contribution to support green power.

City of Lenox

With 11.1 percent of its customers choosing green power, NREL ranks the City of Lenox number one in the



The City of Lenox constructed its wind turbine in October 2003 and is number one in the country for customer participation in its green choice program.

country in customer participation rates. For as little as \$2 a month, electric customers can support the city's wind turbine. Customer contributions support 100 kWh of electricity produced from wind energy each year.

"Our customers have shown interest in the program because they can actually see the wind turbine turning," said Dave Ferris, superintendent of utilities. "They are able to have

ownership over the turbine." The city began offering green power options to its customers in December 2003, and currently have 90 customers in the program.

Butler County Rural Electric Cooperative

Butler County REC also has been successful implementing a green energy program. Customers are able to purchase 100 kWh blocks for \$1.50 a block per month. A maximum of 30 blocks may be purchased. Butler County REC receives its wind energy from both a private wind farm and from Corn Belt Power Cooperative via the Hancock County Wind Energy Center.

"Inserts and information in our billing system have been our most successful venue in providing our customers information about

the program," said Mark Siefken, Butler County REC. The utility has a 2.2 percent customer participation rate, with contributions totaling \$265 a month.

Iowa's utilities are taking innovative approaches to expanding green power purchasing in Iowa. For more information, contact Patti Cale-Finnegan at (515) 242-6043; e-mail: Patti.Cale-Finnegan@dnr.state.ia.us.

Ethanol on the Grow

Iowans set a new record in 2003, giving E-10 (10 percent ethanol, 90 percent gasoline) a 62.3 percent market share of all gasoline sold. This surpasses 2002's record of 55.5 percent.

According to Jennifer Moehlmann, DNR energy data analyst, the growth is credited to stations that achieve sales of ethanol-blended gasoline above 60 percent of all fuel sold. Reaching this mark earns stations a tax credit of 2.5 cents per gallon of ethanol sold above the 60 percent.

In 2004, three new ethanol production plants began operation with capacity totaling 125 million gallons per year.

Eight more ethanol plants are in the planning stages, with four to begin production in 2004.

Five new retail sites are now offering E-85 (85 percent ethanol, 15 percent gasoline): Pronto Convenience Store, Akron; Midwest Farmers Co-op, Orange City; Lyon County Co-op Oil Company, Rock Rapids; Community Oil Co., Rock Valley; and Co-op Gas & Oil, Sioux Center.

Consumption of E-85 grew 32 percent from 2002 to 2003 (compared to 27 percent between 2001 and 2002), but still represents less than 0.01 percent of all gasoline sold in the state.

For more information about ethanol, contact Jennifer Moehlmann at (515) 281-8518, or go to the DNR's Web site at: www.iowadnr.com/energy/



Gas Price Watch

Concerned about rising gas prices?

Find out the latest news on Iowa's gas price situation, along with tips to save during the summer driving season. Go to:

www.iowadnr.com/energy/gasprices.html

Central College Takes "Leed"

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VSC a comprehensive model of sustainability. Retrofitted sinks and lavatories, water-efficient landscaping, and other measures are designed to reduce water consumption by 30 percent. For example, roof rain runoff is captured to water greenhouse plants.

Transportation and other outdoor measures include alternative refueling stations for charging electric vehicles, designated parking for carpools, reflective roofing material, light pollution reduction, and bicycle storage and changing rooms.

Indoor environmental quality was achieved by using low-emitting adhesives, solvents, paints and carpet, and by extensive use of natural daylight. "Studies show that natural daylight can improve performance and work quality of students and employees, and can even increase sales in retail stores," said Lubberden.

The college has also contracted for the purchase of wind power, which will provide 335,000 kWh of renewable energy for the building.

Benefits extend to the environment, community, students

Central College engineers estimate that these and other measures will save about 1,300,000 kWh of electrical energy and 149,201 therms of natural gas annually, as compared to the ASHRAE model of an identical building without sustainable features, resulting in annual cost savings of \$160,000 and significant pollution prevention.

Economic benefits extend to surrounding communities, as well. Sixty percent of the building's construction materials were manufactured within a 500-mile radius of the jobsite – exceeding the LEED standard.

Intangible benefits are equally important to the VSC project team. "One of our main goals is to be a model of education and environmental stewardship for our students, our community and future generations," Lubberden said.

An interactive, electronic informa-



The Vermeer Science at Central College features a solar-powered water fountain and green building materials.

tion kiosk in the VSC lobby demonstrates that commitment. Developed in partnership with Central College, the Iowa DNR and the Iowa Energy Center, the Kiosk informs staff, students and visitors about the VSC, renewable energy, and sustainable design, and gives a detailed explanation of photovoltaics. This Kiosk information can be accessed from Central's website at www.central.edu/VSC_Kiosk/vscpage2.html.

"We encourage other facilities to explore the LEED process," said Jeff Geerts, DNR program planner, noting that five Iowa facilities, including the Iowa Laboratories Facility in Ankeny and the Iowa Department of Public Safety in Des Moines, have registered with LEED.

Lubberden advises interested facility managers to "start discussing the process in the programming phase, before you even think about spading ground. It is a very integrated process, which makes you think about design choices every step of the way."

For more information about the VSC, contact Mike Lubberden at (641) 628-5346 or lubberdenm@central.edu. For more information about LEED, visit www.usgbc.org/LEED.

Build for the

The low-lying masonry buildings of the Iowa Association of Municipal Utilities Office and Training Complex south of Ankeny may seem out of place in a prairie landscape. Habitat borders the buildings, showing a unique contrast of nature and structure. The 25-acre complex is an example of how sustainability can be part of the design, construction and operations of buildings.

"We need to practice what we preach," says Bob Haug, executive director of IAMU. "When we had the opportunity to develop a training and office facility, we wanted to demonstrate the viability of a sustainable approach to site management, building design and construction, and facility operation."

Sustainable design issues include water quality and conservation, energy production and energy efficiency, use of recycled and recyclable materials, indoor air quality, and landscaping.

To improve the environmental and health benefits of your construction or remodeling project, follow these steps:

Identify your needs

Include sustainable design in your planning stages to make the most significant impact.

Choose your "green team"

Undertaking a construction project will likely involve professional contractors. Check with local green building organizations for recommendations of professionals with sustainable design experience.

Design for the environment

Knowledge of local ecosystems will minimize impacts on the environment. Be cognizant of surface and groundwater near your site, local plant and animal species,



The Iowa Association of Municipal Utilities Office and Training Complex near Ankeny.

Environment

and appropriate native materials that could be incorporated.

Choose environmentally friendly materials

When building green, purchase durable materials to minimize replacement. Buy energy efficient appliances, lighting and building components. Use recycled materials, and recycle construction and demolition materials.

Select the right location & equipment

The most cost-effective way to control environmental conditions is by passive means: find a site that protects from the worst weather elements of your region, take advantage of day lighting and passive

solar heating opportunities, and choose materials that provide adequate protection. Modern heating, cooling and ventilation systems, lighting, and appliances provide comfort and convenience, good health and safety. Be sure to select efficient equipment

correctly sized for your building or home.

Landscape

Landscaping can be both beautiful and functional. Plant native trees and shrubs to protect against winter winds or channel cooling breezes during the summer. One large shade tree alone can provide cooling equal to a four-ton air conditioner. Landscaping can also attract birds, butterflies and helpful insects.

Check it out

Once you have constructed or renovated your building, make sure it is safe for occupancy and able to perform as planned.

Finding Direction

Sustainable design is an opportunity to use resources efficiently while creating healthier buildings and homes. For more information, visit www.sustainableiowa.org.



Municipal Utilities

Technology Tracker: Green Materials

Worldwide construction activities consume 3 billion tons of raw materials each year, or 40 percent of total global use. Integrating green building materials into construction projects can reduce the environmental impacts of extracting, transporting, processing, fabricating, installing and disposing building industry materials.

Advancing technologies are helping green building materials to be commercially available with decreasing costs. Using materials that meet the following criteria will increase the sustainability of a building:

◆ **Recycled content:** Products with identifiable recycled content, including postindustrial content with a preference for post-consumer content.

◆ **Natural, plentiful or renewable:** Materials harvested from sustainably managed sources and preferably have an independent certification (e.g., certified wood) and are certified by an independent third party.

◆ **Resource efficient manufacturing process:** Products manufactured with resource-efficient processes including reducing energy consumption, minimizing waste (recycled, recyclable and or source reduced product packaging), and reducing greenhouse gases.

◆ **Locally available:** Building materials, components, and systems

found locally or regionally, saving energy and resources in transportation to the project site.

◆ **Salvaged, refurbished, or remanufactured:** Includes saving a material from disposal and renovating, repairing, restoring, or generally improving the appearance, performance, quality, functionality, or value of a product.

◆ **Reusable or recyclable:** Materials that can be easily dismantled and reused or recycled at the end of their useful life, including packaging.

◆ **Durable:** Materials that are longer lasting or are comparable to conventional products with long life expectancies.

◆ **Improved health impacts:** Materials that emit few or no carcinogens, toxicants, or irritants as demonstrated by the manufacturer through appropriate testing. Also, products and systems that resist moisture or inhibit the growth of biological contaminants in buildings.

◆ **Energy efficiency and water conservation:** Materials, components and systems that reduce the use of energy and water by a building.

For more information on sustainable design, visit the Web site: www.sustainableiowa.org.

From "Environmental Assessment and Specification of Green Building Materials," by Lynn Froeschle, The Construction Specifier, October 1999.

Iowa Sustainable Design Guide Now Available

Resources and Solutions for:

- ◆ Building owners
 - ◆ Designers
 - ◆ Contractors
 - ◆ Occupants
- of commercial and residential buildings

Sustainable design =

- ◆ Reduction of environmental impacts
- ◆ Lower operating costs

Print your copy from www.sustainableiowa.org
or contact Monica Stone at (515) 281-6361





What Iowa's Building Officials Say About Energy Codes

In January 2004, the DNR surveyed Iowa's building code officials to learn more about the knowledge, attitudes and barriers toward energy code adoption in the state.

Building energy codes provide minimum standards for energy-related techniques and equipment in new construction. Lighting, heating and cooling equipment, and insulation are all examples of measures included in energy codes.

Iowa's current state building energy code for residences is the 1992 Model Energy Code (MEC) and for commercial buildings, the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE 90.1-1989) code. Currently, at least 37 states have building energy codes newer than those adopted in Iowa.

In 2002, the legislature passed a law allowing Iowa's local governments to adopt energy codes that exceed current state standards. Six Iowa communities have passed higher codes, including Winterset, Cedar Falls, Sioux Center, Centerville, Pleasant Hill, Winterset, Monticello and Carroll.

The survey, conducted by RMA Research, Sioux Falls, SD, reached 81 of Iowa's 104 building code officials, who are responsible for enforcing building standards in their local regions.

Here is what Iowa's building code officials say about energy codes.

Familiarity

The majority of officials (84 percent) who participated in the study stated they are familiar with current building energy codes in Iowa. In addition, more than half (55 percent) said they were familiar with the newest national energy codes — the 2003 IECC for residential construction and

ASHRAE 90.1-1999 for commercial buildings.

46 percent of Iowa building code officials say the number one reason for adopting energy codes is because "energy efficient buildings save money."

Attitudes

Forty nine percent of all respondents felt that current building energy codes were inadequate and new ones should be adopted, while 31 percent believed current codes are adequate.

According to 46 percent of respondents, the number one reason for adopting higher building energy codes is "energy efficient buildings save money." Additionally, 18 percent believe local control provides better application of codes, and 17 percent believe the codes improve the long-term quality and comfort of buildings.

On the other hand, some building officials believe the biggest disadvantage of energy codes is that "energy efficient buildings cost more to build," according to 26 percent of respondents. Additionally, 18 percent believe lack of resources make codes unenforceable at the local level, and 9 percent said energy codes were a form of over-regulation by the government.

Barriers and Opportunities

More than half of building code officials (57 percent) said they had little or no difficulty adopting and enforcing local building codes, while 27 percent said they found it either somewhat or extremely difficult.

When asked about the biggest barriers to **adopting** local building energy

codes, building officials said the top obstacles are:

- ◆ Lack of information (35 percent)
- ◆ Resistance from contractors/developers (22 percent)
- ◆ Opposition from other groups or individuals (15 percent)
- ◆ Lack of staff and financial resources (14 percent)
- ◆ Lack of community support (12 percent)

Building officials said the top barriers to **enforcing** local building energy codes are:

- ◆ Lack of information (27 percent)
- ◆ Lack of staff and financial resources (25 percent)
- ◆ Opposition from contractors/developers (15 percent)
- ◆ Opposition from other groups or individuals (10 percent)
- ◆ Don't know (31 percent)

Future Plans

Fifteen percent of Iowa's building officials plan to adopt new building energy codes this year. However, 47 percent do not feel the state and federal governments provide enough resources and support for adopting energy codes, and 31 percent recommend more and better educational programs to assist them. Additionally 81 percent of survey participants wish to receive more information about Iowa's building energy codes and the resources available to adopting and enforcing them.

For more information about building energy codes, contact Michael Adams with the DNR at (515) 281-4262; e-mail: Michael.Adams@dnr.state.ia.us. Or go to the U.S. Department of Energy's Web site at: www.energycodes.gov

Iowa Developments

Sustainable Classes at Iowa Colleges

Several Iowa colleges and universities are now offering students energy and waste management related courses at the technical, undergraduate and graduate levels:

- ◆ An upper level undergraduate course, taught by more than 15 guest lecturers, has been created at the University of Iowa for engineering students. The course, Contemporary Topics in Civil Engineering: Sustainable Systems focuses on pollution prevention, energy efficiency and environmental performance practices.
- ◆ In 2003, Iowa State University created a graduate level course called Fundamentals of

Biorenewable Resources, taught by Dr. Robert Brown, director of the Center for Sustainable Environmental Technologies (CSET) at Iowa State University.

- ◆ Iowa Lakes Community College, Estherville, is establishing a wind energy program to help train technicians in the construction and maintenance of wind turbines. The first classes will be taught in the fall of 2004.

For more information, please contact Jan Loyson with the DNR at (515) 281-3142; e-mail: Jan.Loyson@dnr.state.ia.us.

DMACC - West Campus Wins Award

The Des Moines Area Community College West Campus was awarded a first-place Technology Award by the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) during its 2004 winter meeting. The school received recognition for its innovative heating and cooling system. The system distributes heated and cooled air through a 12-inch space

underneath the building's raised floor, drawing its energy from a four-acre pond on the campus using a geothermal water-source heat pump. In areas with concrete floors, water-to-water heat pumps supply an in-floor radiant heating system. The ASHRAE press release is available at: www.ashrae.org/template/AssetDetail?assetid=30941

Waverly Light and Power Commits to Becoming CO2 Free by Mid-Century

Five U.S. electric power companies have committed to becoming the first in the nation to support the World Wildlife Fund's "PowerSwitch! Challenge," which calls for mandatory limits on national CO2 emissions and a commitment to a clean energy action target. The five companies are: Austin Energy, Burlington Electric Department, FPL Group, Inc., Sacramento Municipal Utility District, and Waverly Light and Power of Iowa.

According to the World Wildlife Fund, along with supporting an emissions cap, each

power company has chosen at least one action target from the following:

- increasing energy efficiency by 15 percent by 2020
- using renewables as the source for 20 percent of its electricity sold by 2020
- retiring the least efficient half of coal generation by 2020.

Waverly Light and Power of Iowa committed to increasing its energy efficiency by 15 percent by 2020. For more information, visit the Web site: www.worldwildlife.org

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DNR Corner

2004 Iowa Energy Update Now Available

Every two years the DNR publishes an update on energy policies, programs and milestones in Iowa. The report includes the latest energy trends and developments in energy efficiency and renewable energy for the state. Also available is a complete data report on a CD-ROM. For a copy of this year's report, go to the DNR's Web site at: www.iowadnr.com/energy/, or contact Julie Tack at (515) 281-8665; e-mail: Julie.Tack@dnr.state.ia.us

Interested in High-Temperature Superconductivity for the Power Industry? Schedule a Free Presentation for 2004

An emerging technology that promises high efficiency and reliability for electricity transmission is high-temperature superconductivity.

Considered a "perfect" conductor of electricity, a superconductor experiences no losses or resistance when transmitting electricity. High-temperature superconductivity was discovered in the 1980s and is currently being researched and demonstrated by the U.S. Department of Energy and private industries. This new technology, which is expected to be commercially available in the next decade, offers safe, reliable and environmentally sound benefits to the U.S. power sector.

The Iowa DNR is offering free presentations about the benefits and potential of high-temperature superconductivity. For information, contact Tommi Makila with the DNR at (515) 281-8852, or visit the Web site: www.iowadnr.com/energy/hts/

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